The Pakistan Development Review
39 : 4 Part II (Winter 2000) pp. 951–962

The Systematic Risk and Leverage Effect in the Corporate Sector of Pakistan

MOHAMMED NISHAT

1. INTRODUCTION

Poor corporate financing policies, non-competitive role of institutional development, a tendency towards the underpricing of initial offering resulted in high levered stocks in Karachi stock market (KSE). The KSE is termed as high risk high return emerging market where investors seek high risk premium Nishat (1999). The leverage is the most important factor which determines the firms risk premium [Zimmer (1990)]. Hamada (1969) and Bowman (1979) have demonstrated the theoretical relationship between leverage and systematic risk. Systematic risk of the leverage firm is equal to the without leverage systematic risk of the firm times one plus the leverage ratio (debt equity). Bowman (1979) established that systematic risk is directly related to leverage and the accounting beta (covariability of a firms' accounting earnings with the accounting earnings of the market portfolio). One explanation of time-varying stock volatility is that leverage changes as the relative price of stocks and bonds change. Schwert (1989) demonstrated how a change in the leverage of the firm causes a change in the volatility of stock returns. Haugen and Wichern (1975) analysed the relationship between leverage and relative stability of stock value based on actuarial science[1] and found that the duration of the debt is an important attribute in assessing the effect of leverage on stock volatility. If the leverage is persistent, or changing over time due to the issuance of additional debt, or if the firms are trying to return back the debt, this will change the risk of holding common stock. Kane, Marcus, and McDonald (1985) argued that a well defined metric for the advantage of debt financing is the difference in rates of return earned by optimally levered and unlevered firms, net of a return premium to compensate for potential bankruptcy costs.

Mohammad Nishat is Professor at the Institute of Business Administration, Karachi, and at the Applied Economics Research Centre, University of Karachi.

[1] Hicks (1939); Haugen and Wincher (1974); Malkiel (1962, 1963) who have attempted to isolate the theoretical determinants of risk of equity capital.

After the experience of excessive controls and rigid financial regulation before 1987 in Pakistan, restrained market forces in the allocation of resources, and growing competition at both the national and international level, motivated the deregulation and financial reforms observed after 1987. In addition to several private investment boosting and deregulating policies in the corporate sector during mid eighties, the strategy of corporate financing has also been changed gradually to reduce debt-equity ratio from 80:20 and 60:40 to 50:50 over time. The mandatory quotas of institutional investors before offerings to the public curtailed and now the prices of new shares are determined in the market. The purpose of this policy was to boost private investment participation on competitive basis and reduce the leverage in corporate sector of Pakistan over time.

The objective of the this study is to determine the relationship between leverage and systematic risk in the corporate sector of Pakistan during the non-reform (January 1980 to June (1988) and reform period (July 1988 to December 1994). The rest of the paper is organised as follows: the second section describes the theoretical framework. The econometric methodology is given in section three followed by empirical results in section four. The concluding remarks are provided in section five.

2. THEORETICAL FRAMEWORK AND ECONOMETRIC MODEL

The firm-wise analysis indicates that stock return volatility rises after prices fall [Black (1976); Christie (1982) and Cheung and Ng (1992)]. Two possible explanations are given leverage and time-varying risk premia. The leverage effect posits that a firm's stock price decline raises the firm's financial leverage, resulting in an increase in the volatility of equity [Black (1976); Christie (1982)]. The leverage hypothesis assumes that the volatility of log changes in firm's net asset value (debt plus equity) is constant over time and concludes that the volatility of log changes in the firm's equity varies over time with the firm's debt/equity ratio. A decline in the value of the firm's assets will fall (almost) entirely on the value of equity, thereby raising the firm's debt/equity ratio and raising the future volatility of stock returns [Christie (1982)]. The theory underlying the leverage effect shows that highly levered firms should exhibit a stronger negative relation between stock returns and volatility than should less highly levered firms. Cheung and Ng (1992) find an inverse relation between period t firm stock returns and changes in firm stock return volatility from period t to t+1. They also find that this inverse relation is stronger for firms with large debt/equity ratios. Cheung and Ng (1992) note that this inverse relation is also stronger for smaller firms.

Black (1976), and others [French, Schwert and Stambaugh (1987); Schwert (1989)], however, argued that the response of stock volatility to the direction of returns is too large to be explained by leverage alone. According to the leverage effect, a reduction in the equity value would raise the debt to equity ratio, hence

raising the riskiness of the firm as manifested in an increase in future volatility. As a result, the future volatility will be negatively related to the current return on the stock.

In the literature leverage is described as one of the explanations for the time varying stock return volatility. If the leverage of a firm changes relative to stock and bond prices, the volatility of the firm also changes. In particular, the variance of the return to the assets of a firm is a function of the variances of the returns to the stocks and bonds and the covariance of returns. For a firm with riskless debt, where the variance of the assets of the firm is constant over time, the standard deviation of the stock return is related to the standard deviation of last year's leverage. This shows a change in the leverage of the firm causes a change in the volatility of stock returns.

$$\tilde{R}_{it} = \alpha_0 + \beta\Delta(\delta_{it}) + \mu_{it} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

where $\tilde{R}_{it}$ is the weekly return on industry *i* in period t and $\Delta(\delta_{it})$ is the change in weekly return volatility of the industry *i* in period *t*.

3. DATA

The firm level weekly share prices, dividend, capital issues, and paid-up capital data on KSE is collected and computerised by the author using the original "Daily List" and "List of Daily Trading Documents" published by the KSE during January 1980 to December 1994. The data consists of weekly share prices of 14 industries for which the leverage data is available for the entire period of the study published in Balance Sheet Analysis published by SBP. The data consists of weekly share prices adjusted for dividend and capital issues. The value-weighted returns are calculated and industry portfolios are formulated. The value-weighted industry portfolios are made for non-reform sub-periods (January 1980 to June 1985 and July 1985 to June 1988) and reform sub-periods (July 1988 to June 1991 and July 1991 to December 1994). For further details see [Nishat (1999)].

4. EMPIRICAL RESULTS AND INTERPRETATION

Leverage data on selected industries registered with the KSE are given in Table 1.[2] In all sub-periods of non-reform and reform we observed a significant variation in the extent of leverage across industries. In most cases the debt-equity ratios across industries are higher throughout the study period, except for a few industries like tobacco and vanaspati and allied.[3] During the overall period, the

[2]The SBP publishes the firm-wise Balance Sheet Analysis for the KSE companies, but data on leverage is not readily available for entire study period.

[3]The corporate sector in Pakistan have comparatively easy access to debt and have higher debt-equity ratios. During 1992 government announced plans to limit the debt-equity ratio to 50:50 by 1994. Traditionally the debt-equity ratio has fluctuated between 80:20 to 60:40 depending on extent of concessional loans and sectoral priorities for fiscal concessions.

Table 1

Extent of Leverage for Selected Industries Listed with Karachi Stock Exchange

This table provides the extent of leverage for the selected industries during the overall and sub-periods of non-reform and reform. Leverage is defined as a ratio of total shareholder's equity to total fixed liabilities (book value). The data used to calculate the leverage is provided in Balance Sheet Analysis of State Bank of Pakistan on annual basis.

Industry	Overall period Jan 1980 to Dec 1994	Non-reform Sub-period I Jan 1980 to June 1985	Non-reform Sub-period II July 1985 to June 1988	Reform Period July 1988 to Dec 1994	Reform Sub-period I July 1988 to June 1991	Reform Sub-period II July 1991 to Dec 1994
Cotton	1.295**	1.547	1.837	1.044	1.099	0.987
Chemical	0.436	0.470	0.238	0.467	0.278	0.639
Engineering	0.583*	0.408	0.570	0.748	0784	0.763
Sugar and All	0.532*	0.349	0.408	0.736	0.576	0.875
Paper and Paper Board	2.025**	2.877	1.603	1.549	2.191	0.741
Cement	0.748	0.849	0.568	0.739	0.675	0.818
Fuel and Energy	1.073	1.093	0.995	1.084	1.067	1.137
Transport and Commun.	1.337*	1.649	1.500	1.038	1.033	0.945
Tobacco	0.270	0.309	0.215	0.254	0.204	0.328
Jute[a]	0.460*	0.358	0.534	0.539	0.572	0.492
Vanaspati and Allied	–0.068	0.081	0.076	–0.238	0.300	–0.472
Misc.	0.530	0.477	0.704	0.532	0.612	0.455
Overall	0.809	0.924	0.854	0.733	0.806	0.669

[a]Indicates difference in the extent of leverage during no-reform and reform period.

[b]Indicates difference in the extent of leverage during non-reform and the second sub-period of reforms.

*Significant at 0.05 level.**Significant at 0.10 level.

average leverage is 0.809. Cotton, paper and paper board, fuel and energy, and transport and communications, indicated above average leverage. The average leverage increased during the first sub-period of non-reform. However, the pattern of leverage across industries does not change much over time. The extent of leverage is comparatively lower during the reform period.

A notable change is observed in cotton, engineering and sugar and allied where the leverage magnitudes are higher during the reform sub-periods than the non-reform sub-periods. Other industries do have variations in their leverage magnitudes, but the pattern has been almost the same across non-reform and reform sub-periods. Paper and paper board has the highest level of leverage in most cases, whereas vanaspati and allied have the lowest level of leverage throughout all the sub-periods of non-reform and reform. The following model is estimated to test the hypothesis that highly levered industries in Pakistan should exhibit a stronger

negative relation between stock returns and change in volatility than should less levered industries:

$$\tilde{R}_{it} = \alpha_0 + \beta\Delta(\delta_{it}) + \mu_{it} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

where $\tilde{R}_{it}$ is the weekly return on industry *i* in period *t* and $\Delta(\delta_{it})$ is the change in weekly return volatility of the industry *i* in period *t*.

We estimate the returns and risk relationship with the hypothesis that leverage causes a change in the volatility of stock returns [Christie (1982) French, Schwert and Stambaugh (1987); Schwert (1989) and Cheung and Ng (1992)]. The regression results for industry returns and change in industry return volatility relationships are presented in Tables 2 to 7. The relationship between returns and change in return volatility during the overall period generalise the strong negative relation for highly levered industry as described in other studies. Few of the less levered industries also indicate a negative and significant relationship between return and change in volatility. Less levered industries either have an insignificant relation between returns and change in volatility (vanaspati and allied) or weaker negative relationship than levered industries.

Table 2

The Leverage Effect for the overall period (January 1980 to December 1994). Model estimated: $\tilde{R}_{it} = \alpha_0 + \beta\Delta(\delta_{it}) + \mu_{it}$ *, where* $\tilde{R}_{it}$ *is the return on industry in time period t,* $\Delta(\sigma_{it})$ *is the change in volatility of return on industry in time period t*

Industry	α	$t(\alpha)$	β	$t(\beta)$	$\bar{R}^2$	s. e.
Cotton	0.536	5.777	–0.035	–6.535	0.133	1.741
Chemical	0.356	2.571	–0.029	–3.537	0.043	2.323
Engineering	0.554	2.453	–0.026	–12.221	0.349	3.779
Sugar and All.	0.415	3.134	–0.054	–10.901	0.268	2.215
Paper and Paper Board	0.501	2.325	–0.015	–9.853	0.259	3.606
Cement	0.419	1.721	–0.016	–8.809	0.218	4.085
Fuel and Energy	0.304	2.459	–0.046	–6.485	0.131	2.074
Transport and Commun.	0.384	1.856	–0.029	–8.613	0.211	3.465
Tobacco	0.243	1.339	–0.034	–7.222	0.158	3.048
Jute	0.314	2.251	–0.049	–6.832	0.143	2.336
Vanaspati and Allied	0.534	2.451	0.000	0.418	0.001	3.649
Misc.	0.262	1.754	–0.018	–15.101	0.451	2.503

Table 3

The Leverage Effect for the non-reform sub-period I (January 1980 to June 1985). Model estimated: $\tilde{R}_{it} = \alpha_0 + \beta\Delta(\delta_{it}) + \mu_{it}$ *, where* $\tilde{R}_{it}$ *is the return on industry in time period t,* $\Delta(\sigma_{it})$ *is the change in volatility of return on industry in time period t*

Industry	α	*t*(α)	β	*t*(β)	$\overline{R}^2$	s. e.
Cotton	0.241	2.308	–0.053	–6.535	0.133	1.741
Chemical	0.356	2.571	–0.029	–3.537	0.043	2.323
Engineering	0.554	2.453	–0.026	–12.221	0.349	3.779
Sugar and All	0.415	3.134	–0.054	–10.901	0.268	2.215
Paper and Paper Board	0.501	2.325	–0.015	–9.853	0.259	3.606
Cement	0.419	1.721	–0.016	–8.809	0.218	4.085
Fuel and Energy	0.304	2.459	–0.046	–6.485	0.131	2.074
Transport and Commun.	0.384	1.856	–0.029	–8.613	0.211	3.465
Tobacco	0.243	1.339	–0.034	–7.222	0.158	3.048
Jute	0.314	2.251	–0.049	–6.832	0.143	2.336
Vanaspati and Allied	0.534	2.451	0.000	0.418	0.001	3.649
Misc.	0.262	1.754	–0.018	–15.101	0.451	2.503

Table 4

The Leverage Effect for the non-reform sub-period II (July 1985 to June 1988). Model estimated: $\tilde{R}_{it} = \alpha_0 + \beta\Delta(\delta_{it}) + \mu_{it}$ *, where* $\tilde{R}_{it}$ *is the return on industry in time period t,* $\Delta(\sigma_{it})$ *is the change in volatility of return on industry in time period t*

Industry	α	*t*(α)	β	*t*(β)	$\overline{R}^2$	s. e.
Cotton	1.069	4.446	–0.027	–5.189	0.149	2.995
Chemical	0.466	2.753	–0.045	–6.281	0.205	2.108
Engineering	0.465	1.692	–0.014	–7.521	0.269	3.426
Sugar and All	0.574	3.164	–0.027	–14.421	0.576	2.259
Paper and Paper Board	0.234	0.976	–0.031	–4.249	0.106	2.987
Cement	0.668	3.023	–0.044	–6.902	0.237	2.754
Fuel and Energy	0.409	2.522	–0.062	–4.235	0.105	2.021
Transport and Commun.	0.656	1.093	–0.006	–2.112	0.028	7.477
Tobacco	0.267	0.955	–0.023	–4.981	0.139	3.491
Jute	0.201	0.968	–0.027	–6.257	0.203	2.584
Vanaspati and Allied	0.321	1.178	0.001	0.334	0.001	3.397
Misc.	0.443	1.888	–0.028	–7.114	0.248	2.922

Table 5

The Leverage Effect for the reform period (July 1988 to December 1994). Model estimated: $\tilde{R}_{it} = \alpha_0 + \beta\Delta(\delta_{it}) + \mu_{it}$ *, where* $\tilde{R}_{it}$ *is the return on industry in time period t,* $\Delta(\sigma_{it})$ *is the change in volatility of return on industry in time period t.*

Industry	α	$t(\alpha)$	β	$t(\beta)$	$\bar{R}^2$	s. e.
Cotton	0.535	3.396	–0.045	–7.509	0.147	2.857
Chemical	0.629	3.298	–0.022	–5.637	0.089	3.454
Engineering	0.669	3.009	–0.012	–10.311	0.246	4.032
Sugar and All	0.251	2.066	–0.046	–8.553	0.183	2.198
Paper and Paper Board	0.532	2.937	–0.036	–15.121	0.412	3.282
Cement	0.812	3.811	–0.021	–8.945	0.197	3.861
Fuel and Energy	0.792	3.882	–0.022	–12.021	0.307	3.699
Transport and Commun.	0.586	1.572	–0.012	–9.042	0.201	6.761
Tobacco	0.545	2.196	–0.019	–13.231	0.349	4.494
Jute	0.009	0.047	–0.021	–10.181	0.241	3.472
Vanaspati and Allied	0.435	2.339	0.000	0.171	0.009	3.367
Misc.	0.717	4.646	–0.042	–8.135	0.179	2.796

Table 6

The Leverage Effect for the reform sub-period I (July 1988 to June 1991). Model estimated: $\tilde{R}_{it} = \alpha_0 + \beta\Delta(\delta_{it}) + \mu_{it}$ *, where* $\tilde{R}_{it}$ *is the return on industry in time period t,* $\Delta(\sigma_{it})$ *is the change in volatility of return on industry in time period t.*

Industry	α	$t(\alpha)$	β	$t(\beta)$	$\bar{R}^2$	s. e.
Cotton	0.454	2.781	–0.067	–5.468	0.166	2.014
Chemical	0.535	2.842	–0.071	–6.435	0.216	2.323
Engineering	0.448	2.136	–0.054	–6.551	0.222	2.589
Sugar and All	0.277	1.711	–0.053	–5.695	0.178	1.996
Paper and Paper Board	0.279	1.419	–0.041	–17.951	0.682	2.427
Cement	0.154	0.648	0.009	1.547	0.015	2.929
Fuel and Energy	0.506	3.025	–0.081	–11.051	0.448	2.058
Transport and Commun.	0.006	0.321	–0.025	–2.721	0.047	3.949
Tobacco	0.339	1.059	–0.018	–4.848	0.135	3.952
Jute	0.125	1.568	–0.047	–10.421	0.419	2.717
Vanaspati and Allied	0.434	2.159	–0.000	–0.281	0.000	2.482
Misc.	0.418	2.829	–0.094	–8.651	0.333	1.822

Table 7

The Leverage Effect for the reform sub-period II (July 1988 to December 1994). Model estimated: $\tilde{R}_{it} = \alpha_0 + \beta\Delta(\delta_{it}) + \mu_{it}$ *, where* $\tilde{R}_{it}$ *, is the return on industry in time period t,* $\Delta(\sigma_{it})$ *is the change in volatility of return on industry in time period t*

Industry	α	$t(\alpha)$	β	$t(\beta)$	$\bar{R}^2$	s. e.
Cotton	0.605	2.351	–0.043	–5.564	0.151	3.414
Chemical	0.708	2.264	–0.018	–3.719	0.073	4.149
Engineering	0.856	2.321	–0.012	–8.051	0.271	4.894
Sugar and All	0.227	1.283	–0.047	–6.537	0.197	2.354
Paper and Paper Board	0.748	2.552	–0.028	–5.965	0.169	3.891
Cement	1.378	4.311	–0.026	–9.086	0.322	4.243
Fuel and Energy	0.937	2.753	–0.021	–9.188	0.326	4.519
Transport and Commun.	1.079	1.679	–0.012	–6.846	0.212	8.535
Tobacco	0.722	1.944	–0.021	–11.421	0.428	4.931
Jute	–0.158	-0.553	–0.016	–7.089	0.224	3.811
Vanaspati and Allied	0.435	1.449	0.001	0.798	0.004	3.984
Misc.	0.976	3.843	–0.034	–5.611	0.153	3.369

During the first sub-period of non-reform most of the industries have a negative and significant relationship between return and changes in return volatility except vanaspati and allied which has positive and insignificant coefficient. Higher levered industries have a strong negative relationship between returns and change in return volatility compared to less levered industries. During the second sub-period of non-reform, most of the industries have a negative and significant relation between return and changes in return volatility except vanaspati and allied. However, higher levered industries have stronger negative relation between return and change in return volatility during this sub-period. The average leverage magnitudes during reform sub-periods are less than the average leverage magnitude during non-reform sub-periods. The negative and significant relationships between return and change in return volatility are consistent in most cases. The higher levered industries have a stronger negative relationship between return and change in return volatility during both sub-periods of reform. A similar pattern is observed during the overall reform period. The more highly levered industries have a negative and in most cases significant relationship between returns and changes in return volatility. However, some variations in the strength of this negative relationship between return and change in return volatility has been observed in all sub-periods. The leverage level in Pakistan has been relatively high, hence the consistent negative and significant relationships between return and change in volatility are observed during both non-reform and reform sub-periods. In most cases higher levered industries indicated stronger negative relationships between return and change in volatility than the less levered industries. The leverage effect is better explained during the non-reform than the reform period.

5. CONCLUDING REMARKS

The above findings indicate that leverage at industry level has been historically high in Pakistan, hence the consistent negative and significant relationships between return and volatility change are observed. In most cases, highly levered industries had a stronger negative relationship between return and volatility change than the less levered industries. The leverage effect was better explained during the non-reform than the reform period.

REFERENCES

Black, F. (1976) Studies of Stock Market Volatility Changes. *Proceedings of the American Statistical*, Association, Business and Economic Statistics Section. 177–81.

Bowman, R. G. (1979) The Theoretical Relationship Between Systematic Risk and Financial (Accounting) Variables. *Journal of Finance* 34:3, 617–630.

Cheung, Yin-Wong, and L. K. Ng (1992) Intersections Between the U. S. and Japan Stock Market Indices. *Journal of International Financial Management, Institutions and Markets* 21:1, 93–108.

Christie, A. A. (1982) The Stochastic Behaviour of Common Stock Variance Value, Leverage and Interest Rate Effects. *Journal of Financial Economics* 10, 407–32.

French, K. R., G. W. Schwert, and R. F. Stambaugh (1987) Expected Stock Returns and Volatility. *Journal of Financial Economics* 19, 3–29.

Hamada, K. (1969) Optimal Capital Accumulation by an Economy Pacing an International Capital Market. *Journal of Financial Research* 17:2, 175–186.

Haugen, R. A., and D. W. Wichem (1974) The Elasticity of Financial Assets, *Journal of Finance* 29, 1229–40.

Hicks, J. R. (1939) *Value and Capital.* Oxford: Clarendon Press.

Kane, E. J., A. J. Marcus, and R. L. McDonald (1985) Debt Policy and the Rate of Return Premium to Leverage. *Journal of Financial and Quantitative Analysis* 28:2, 479–500.

Malkiel, B. G. (1962) Expectations, Bond Prices and the Term Structure of Interest Rate. *Quarterly Journal of Economics* 76: 2, 197–218.

Malkiel, B. G. (1963) Equity Yields Growth and the Structure of Share Prices. *American Economic Review* 53: 5, 1004–1031.

Nishat, M. (1999) The Impact of Institutional Development on Stock Prices in Pakistan, Unpublished Dissertation, Auckland Business School, University of Auckland, Auckland.

Schwert, G. W. (1989) Why Does Stock Market Volatility Change Over Time? *Journal of Finance* 44:5, 1115–1154.

State Bank of Pakistan (1980–1995) Balance Sheet Analysis of Companies Listed with Karachi Stock Exchange.

Zimmer, S. A. (1990) Event Risk Premia and Bond Market Incentives for Corporate Leverage. *FRB New York Quarterly Review* 15:1, 15–30.

Comments

Although a number of initiatives have been taken in research on stock market behaviour in Pakistan, it appears that economists in Pakistan still consider this area of research outside their domain. In today's global financial market the role of stock markets in the economy, both in the short run and long run, cannot be understated. Perhaps the day-to-day fluctuations in stock prices that do not coincide with current economic conditions leave an impression that stock markets do not really serve as the so-called 'barometer' of the state of economy. Another reason could be that despite a remarkable growth in its size and sensitivity, the stock market in Pakistan still remains small and ups and downs in the market do not always serve as important signals for what lies ahead for the economy. But if the past trends and the current global financial market conditions have any relevance to future, one can predict with a high level of confidence that the stock market's sole in Pakistan will rise. Research on stock market, in particular the one that links finance with economics is important not only to understand the complex nature of the subject but also to lay foundations for future work.

The paper by Mohammad Nishat is a useful contribution to the subject and it can serve as a foundation work for future research. The study estimates the effects of changes in weekly volatility on the average weekly returns for the overall Karachi Stock market and its 12 industrial sectors. This relationship is then analysed in the light of leverage position of each industry, defined as the ratio of equity to fixed liabilities. The main finding of the study is that weekly returns are inversely related to weekly changes in volatility and the relationship is stronger in the high-leverage industries. The analysis is repeated for various sub-periods from January 1980 to December 1994 and it is found that the relationship holds for each sub-period. Thus the study provides reasonably strong and consistent evidence to conclude that leverage effect is present in Karachi Stock Exchange.

Leverage effect is a well-tested proposition in developed markets. In an emerging market like Pakistan thin trading and rent-seeking speculations can distort the leverage effect. It is indeed a revelation that the evidence on the presence of leverage effect is so strong and consistent. The author can take this result as a stepping stone to further analyse the implications of leverage effect. If the required data are available the analysis can be repeated at firm level, because the leverage effect estimated at the aggregate industry level is likely to have suppressed some useful information. Furthermore, the author can analyse the consequences of leverage effect for asymmetry in the risk-return relationship. This analysis is quite useful to understand the dynamics of the markets, especially in the presence of negative return shocks that are no common in case of Pakistan.

The author has done a remarkable job in compiling all the detailed data required for the analysis. It is quit well known that stock market data are not entirely available in ready-to-use form and it needs a great deal of persistent hard work and dedication to complete the task. The author also deserves appreciation for professional approach. In spite of huge data work, the presentation of the research is precise and to the point. The paper is well organised and there is no indication of contamination of results by preconception.

There are a few typing errors, misplaced footnotes at the tables of results and missing pieces of information, such as the computation of volatility. It is expected that the author will revise his presentation for the final submission.

Eatzaz Ahmad

Quaid-i-Azam University,
Islamabad.